



Proposed Plan to Clean Up Ground Water at the T-25 Area

The Army is releasing this proposed plan to clean up ground water at the T-25 Area at the U.S. Army Soldier Systems Center (SSC) in Natick, Massachusetts. SSC is a research facility located approximately 17 miles west-southwest of Boston, occupying a small peninsula extending into the South Pond of Lake Cochituate. Based on environmental investigations and risk assessments, the Army has determined that ground water cleanup is necessary at the T-25 Area at SSC.

Learn More About the Plan

The Army will describe the proposed T-25 Area ground water cleanup plan at an informational meeting on September 9, 1999. At the meeting, representatives from the Army, the U. S. Environmental Protection Agency (EPA), and the Massachusetts Department of Environmental Protection (DEP) will respond to your comments, questions and concerns about the proposed T-25 Area ground water cleanup.



Informational Meeting

7:00 PM
Thursday, September 9, 1999
Town of Natick Main Fire Station
22 East Central Street
Natick, Massachusetts

Let Us Know What You Think

The Army is accepting public comments on the *Proposed Remedial Action Plan (Proposed Plan)* through September 24, 1999. If you have a comment or concern about the cleanup plan, the Army, EPA, and DEP want to hear it before making a final decision on how work should proceed to protect your community. You may provide formal comments at the public hearing.



Public Hearing

7:00 PM
Thursday, September 16, 1999
Town of Natick Main Fire Station
22 East Central Street
Natick, Massachusetts

More information about how and where to submit your comments on this proposed cleanup plan is provided on page 13.

To find out more about the informational meeting and public hearing on the Proposed Plan, call SSC's Public Affairs Officer at (508) 233-5340.

Please note: Words that appear in Italics are defined in the glossary on page 14 of this Proposed Plan.

What is the Proposed Cleanup?

After careful study of the T-25 Area (a.k.a. Warehouse Area) at SSC, the Army proposes the following plan to reduce potential risk from *ground water* contamination:

- Pump ground water contaminated with dissolved solvents out from beneath the T-25 Area, treat the pumped water using *air stripping* and *carbon adsorption* equipment to remove the solvents, then release the cleaned water to the lake.
- Implement legal controls to restrict access to the ground water.
- Allow for monitored *natural attenuation* processes to reduce the low-level ground water dissolved solvent concentrations to acceptable levels in off-site areas.
- Regularly monitor ground water conditions to make sure that the concentration of the primary contaminants *perchloroethylene (PCE)* and *trichloroethylene (TCE)*, as well as the secondary contaminants (metals, a pesticide, and a plasticizer), are decreasing, source area contamination is contained within the T-25 Area, and monitored natural attenuation processes are occurring.
- Conduct reviews at least every five years to evaluate the status and efficiency of the ground water cleanup.
- To further protect public health and safety, the Army has made a commitment to participate in the operation of drinking water treatment systems at the town of Natick Springvale Treatment Plant.

The Army is issuing this Proposed Plan with support from the EPA and the DEP.



INTRODUCTION

The Army is releasing this Proposed Plan to address the ground water contamination located at the T-25 Area at SSC in Natick, Massachusetts. In accordance with Section 117(a) of the *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*, this Proposed Plan provides information on the preferred remedial alternative developed by the Army with support from the EPA and the DEP. The objectives of this Proposed Plan are:

1. To describe the remedial alternatives evaluated to address the ground water contamination at the T-25 Area,
2. To identify the preferred remedial alternative,
3. To explain why the preferred alternative was selected,
4. To request the Public's involvement in the selection of a final cleanup remedy, and
5. To serve as a companion to the *Administrative Record* file.

SITE BACKGROUND

Site Description

SSC is located approximately 17 miles west-southwest of Boston in Natick, Massachusetts. This 78-acre research facility occupies a small peninsula extending from the eastern shoreline of the South Pond of Lake Cochituate. The land use surrounding the northern portion of SSC includes residential, commercial/retail, and light industrial areas. The facility is located approximately 2,500 feet southeast of the Springvale Municipal Water Supply Well Field. The Springvale Municipal Well Field currently has a wellhead treatment system operating to address regional low concentrations of volatile organic compound (VOC) contamination. A site location map is provided (see Figure 1).

The T-25 Area, named because Building T-25 is located there, is a 15.6-acre rectangular area in the northwestern portion of the SSC facility. The T-25 Area is generally referred to in this plan as on site, while areas outside of the T-25 Area are referred to as off site. The area contains buildings, paved areas, and a baseball field for employees. An unpaved perimeter road on an embankment rings the area approximately 10 feet above the base of the site, and is surrounded by another 10-foot tall embankment and a chain-link fence. The T-25 Area is bounded to the west, north, and east by residential properties; it is bounded to the south by the rest of the SSC facility.

Based on environmental investigations and risk assessments, the Army has determined that ground water cleanup is necessary at the T-25 Area at SSC. To keep the T-25 Area ground water contamination from

spreading farther and to evaluate the proposed cleanup plan, a ground water pump-and-treat system has been built and is currently in operation as part of a Treatability Study. This system is successfully cleaning up ground water pumped from beneath the T-25 Area, and is containing the T-25 Area contamination within the site and cutting off the supply of further contamination off site.

Site History

SSC has previously been called the Quartermaster Research and Engineering Command; the U.S. Army Natick Research and Development Command; the U.S. Army Natick Research, Development, and Engineering Center; and the Soldier Systems Command. SSC has been a permanent Army installation since October 1954. Its mission includes research and development activities in food engineering; food science; clothing, equipment, and materials engineering; and aero-mechanical engineering.

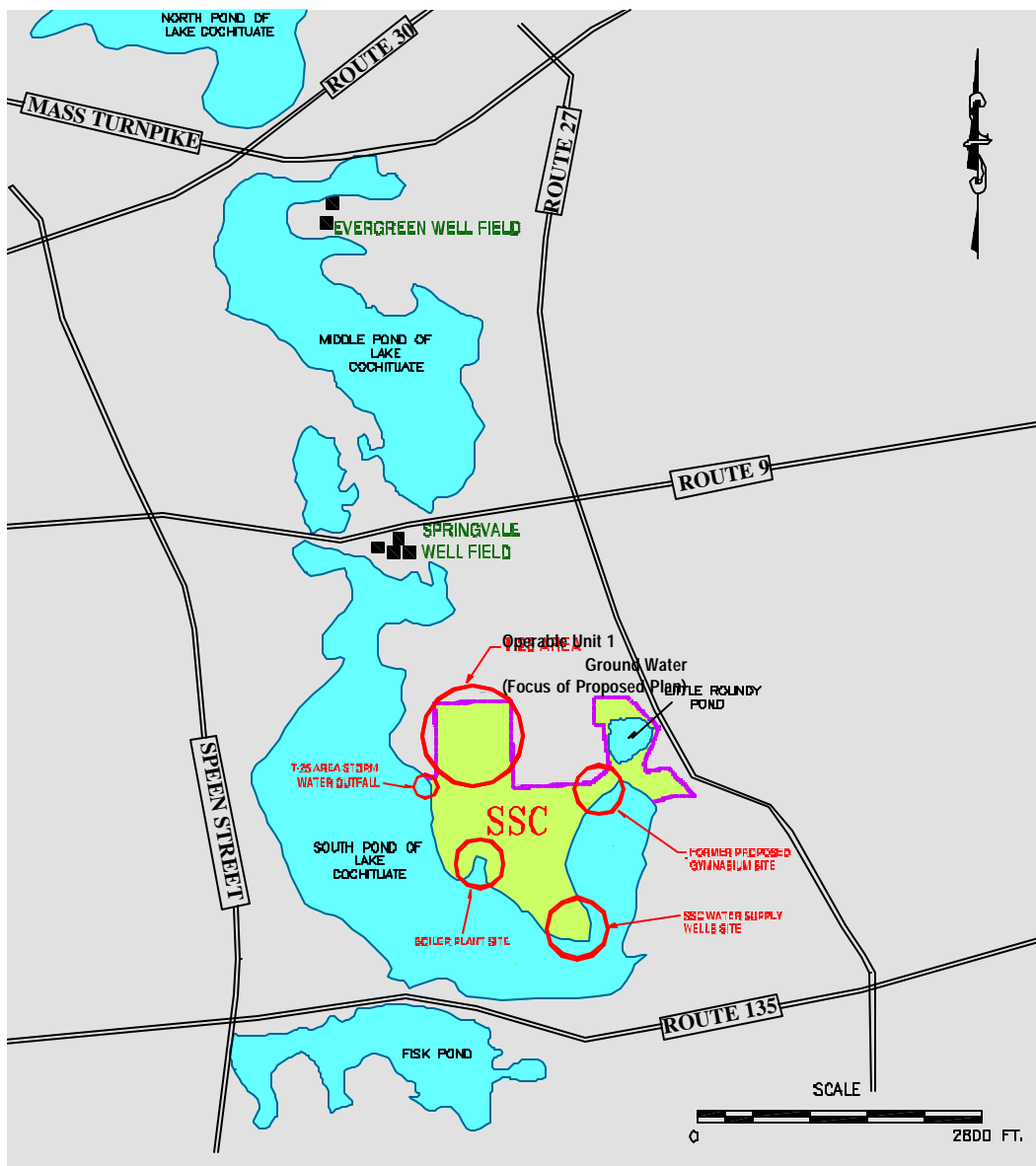
The T-25 Area was formerly a gravel pit owned and operated by the town of Natick. It was then regraded prior to development by the Army in 1954. The Army has used this area for indoor and outdoor storage of bulk items, wastes, petroleum, solvents, antifreeze, pesticides, and Freon 113; warehouse operations; laboratory research involving petroleum, oil, and lubricant pumping equipment, refrigeration units, and various types of fuel in engines; clothing and textile research; drop-testing; waste incineration; and garage operations, including spray painting, vehicle maintenance, insect and rodent control, metal parts and brush cleaning, battery charging, silk screening, and rubber adhesive thinning.



The primary contaminants of concern in the ground water beneath the T-25 Area are the solvents PCE and TCE. The Army has used these solvents at SSC for washing vehicle metal parts, dry cleaning in mobile units, fabric treatment, and in relatively smaller amounts in various laboratories. The largest volumes of TCE were used in the Climactic Control Chamber (Building No. 2) in a cooling brine solution (use of TCE in this facility ended in the mid-1990s). PCE and TCE have been used by the facility since SSC was constructed in 1954 to the present. The amount used at SSC has steadily decreased to a current level of less than 10 gallons per year for the entire facility. It is not known if PCE and TCE were used in the T-25 Area prior to construction of the facility.

In May 1994, SSC was added to the Superfund *National Priorities List (NPL)* in part as a result of ground water contamination found in the T-25 Area and the proximity of the contamination to the Springvale Municipal Water Supply Well Field.

Figure 1: Site Location Map





Summary of Environmental Investigations

Detailed environmental investigation reports are available for public review in the Administrative Record maintained at SSC, the EPA, the DEP, and at the Natick Public Library. Starting in 1980, the Army performed routine environmental studies as part of the *Installation Restoration Program*. In 1994, the EPA added the site to the National Priorities List, based mainly on ground water contamination found in the T-25 Area.

The most detailed environmental report concerning the T-25 Area is the Final Phase II *Remedial Investigation Report: T-25 Area* at the U.S. Army Soldier Systems Command (SSCOM), Natick, Massachusetts (December 1998), which includes Phase I data. Field work during the remedial investigation included soil, ground water, sediment, and surface water sampling and analysis, hydrogeological characterization, and an ecological survey. Ecological risk and human health risk were assessed, and state, local, and facility documentation were reviewed and evaluated.

Results of the remedial investigation indicate that dissolved chlorinated solvents are present at elevated concentrations in the ground water beneath the T-25 Area (Figure 2). The solvents TCE and PCE are found in the ground water at the site at depths primarily between approximately 30 and 60 feet below ground surface. Concentrations of TCE and PCE decrease with increasing distance from the central portion of the site, however they do extend off site to the north and the west at levels above federal and state drinking water standards. The origin of the TCE and PCE ground water contamination has not been identified. TCE and PCE are the primary contaminants of concern in the T-25 Area. Other secondary contaminants [metals, DDT (a pesticide), and bis(2-ethylhexyl)phthalate (a plasticizer making plastic flexible)] have been detected sporadically in the ground water.

The soils associated with the T-25 Area do not pose a human health or ecological risk. Previously, an isolated area of pesticide-contaminated soil was removed from a small storage area within the T-25 Area under a separate removal action. That removal action is not discussed in this Proposed Plan to clean up ground water.

Public Involvement

The public has been involved in a number of different ways. They have been kept informed through regular newsletters and open houses, and they have direct involvement as a result of a Restoration Advisory Board (RAB). A RAB was formed for SSC in 1995, with members from the public at large (including SSC neighbors and town representatives), SSC facility staff, and federal and state regulators. The purpose of the RAB is not only informational, but also to actively solicit input from local stakeholders to ensure that any cleanup addresses community concerns. Members of the RAB have not only reviewed the planning and report documents, but have also provided valuable comments and insights on all phases of the process, from investigation through cleanup, including this Proposed Plan.

Summary of the Treatability Study

In November 1997, the Army constructed a ground water pump-and-treat system (extraction wells with air-stripping and granular activated carbon) as part of a Treatability Study. The purposes of this study are to determine if the pumping system can contain the T-25 Area ground water contamination within the site, evaluate if the selected ground water treatment equipment can successfully clean the contaminated ground water, and identify operation and maintenance requirements for a final, long-term ground water cleanup design. Data have been evaluated for the Treatability Study, and are grouped into four categories:

- Pumping data from two extraction wells have been collected to find the best pumping rates to contain and capture contaminated T-25 Area ground water. The ground water is contained within the T-25 Area. After more than a year of pumping, data indicate some influence off site to the west and north of the T-25 Area.
- Treatment system chemical data have shown that the air-stripping equipment, particulate filters, and activated carbon adsorbers can successfully remove contaminants from the ground water. Resulting air and water effluents meet current regulatory requirements.
- Treatment system operational data have recommended slight system changes to improve the way the system filters out oxidized metals (such as iron rust).
- Ground water chemical data have shown significant decreases in dissolved PCE and TCE concentrations at and near the extraction wells. After a year of pumping, concentrations of TCE and PCE off site to the west and north of the T-25 Area are decreasing.

Figure 2: Approximate Extent of Ground Water PCE and TCE Concentrations Exceeding Drinking Water Criteria in 1997 prior to the Treatability Study

Scope and Role of Response Action

The T-25 Area is one of the investigations ongoing at SSC; other areas are indicated in Figure 1. The remedial investigation of the T-25 Area ground water has been completed and this plan proposes a remedy for the contaminated ground water. The T-25 Area ground water is known as *Operable Unit 1*. An isolated area of pesticide-contaminated soil, which did pose some ecological risk to wildlife, was previously removed from a small storage area within the T-25 Area, under a separate removal action. The lake water and sediments associated with the T-25 Area storm water outfall pose no significant human

health risks. However, potential ecological risks to sediment-dwelling invertebrates (e.g., worms, insects, and mussels) were found, and are being studied further (as a separate operable unit) to assess if a sediment *remedial action* is necessary. The ecological risks are driven primarily by pesticides and polycyclic aromatic hydrocarbons (PAHs). This Proposed Plan for the T-25 Area ground water cleanup does not address sediments or surface water associated with the T-25 Area storm water outfall. Any investigation or remedial activities at the T-25 Area storm water outfall will be conducted independently of Operable Unit 1, the T-25 Area ground water. This is because the source, distribution, and contaminants found at the T-25 Area storm water outfall are separate and distinct from those found in the T-25 Area ground water, and will require separate and distinct actions. A Tier II Ecological Risk Assessment (ERA) is currently ongoing at the T-25 Area storm water outfall. Other areas of SSC currently under investigation under separate actions include the Former Proposed Gymnasium Site, the Boiler Plant Site, and the SSC Water Supply Wells Site. These areas may become operable units in the future.





WHY IS GROUND WATER CLEANUP FOR THE T-25 AREA NECESSARY?

As part of the remedial investigation, the Army conducted a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) at the T-25 Area.

Human Health Risk Assessment

The objective of the HHRA was to determine whether conditions at the T-25 Area may cause current or potential future human health risks. Risks were quantified for potential exposures, via numerous pathways, to surface soil, subsurface soil, ground water, and sediment and surface water near the T-25 Area storm water outfall. Although there were uncertainties associated with the HHRA, conservative assumptions were used to protect the potentially most exposed and/or most sensitive individuals, and to provide conservative estimates of risk that would be used to determine the need for and possible extent of cleanup activities at the T-25 Area.

Estimated noncancer and cancer risks exceeded the EPA's generally acceptable levels (cancer risk= 1×10^{-4} to 1×10^{-6} and noncancer risk less than 1) for future residential ground water ingestion and for dermal contact during future industrial use of the ground water directly beneath the T-25 Area. The residential risks are driven by the PCE (cancer risk= 1.2×10^{-3} and noncancer risk=5.48) and TCE (cancer risk= 6.5×10^{-5} and non-cancer risk=2.28) contamination and certain metals. These risks are calculated for adult ingestion of drinking water, using the maximum concentrations detected at the site. Although it is very unlikely that water from beneath the T-25 Area will be developed for either residential or industrial use, these results indicate that ground water should be a priority for cleanup. In addition, the aquifer beneath the site has been classified by the state of Massachusetts as GW-1, a drinking water supply, and was determined to be of high use and value.

There are also secondary contaminants of concern, including metals (chromium, lead, manganese, nickel, thallium, vanadium), bis(2-ethyl hexyl) phthalate (a plasticizer), and DDT (a pesticide). While these contaminants may contribute some risk, it is unclear whether their presence is site related. This uncertainty is due to some question about the sampling technique used during the investigation phases and/or whether the contaminants are present due to ambient conditions.

Since they do contribute some risk, they are addressed in the proposed T-25 Area ground water cleanup.

The estimated noncancer and cancer risks for surface soil and subsurface soil contact for all potentially exposed populations show that incremental risks are below or within the range generally considered acceptable by the EPA. For potential sediment and surface water contact during swimming at the T-25 Area storm water outfall, the estimated noncancer and cancer risks are also below or within the range generally considered acceptable by the EPA.

Ecological Risk Assessment

A Tier I ERA was conducted to assess the ecological impact and risk of the surface soils associated with the T-25 Area. No significant ecological risks were found for the soils in the T-25 Area ballfield. Pesticides found in the storage area soils, which did pose some ecological risk to wildlife, have been removed and disposed of off site.

Summary of Risk Assessment Findings and Recommendations

- The ground water associated with the T-25 Area needs to be addressed, based on potential future risk of the water being used as a drinking water source.
- The soils associated with the T-25 Area do not pose an unacceptable incremental human health or ecological risk. Previously, an isolated area of soil contaminated with pesticides, which did pose some ecological risk to wildlife, was removed from a small storage area within the T-25 Area under a separate removal action. No current soil source area for the observed ground water contamination was found during the investigation. Therefore, no action for soils is anticipated under this ground water proposed plan.

Actual or threatened releases of hazardous substances from this site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or future threat to public health, welfare, or the environment.

REMEDIATION OBJECTIVES

The remediation objectives for cleanup of the ground water beneath the T-25 Area are to:

- Prevent contamination in the ground water, above federal and state drinking water standards, from migrating outside of the T-25 Area toward off-site receptors



- Prevent any potential exposure to ground water beneath the T-25 Area and off site with contaminant concentrations in excess of federal and state drinking water standards
- Restore aquifer to drinking water standards within a reasonable time frame
- Monitor potential future migration of ground water contamination to verify that elevated concentrations decrease over time

Based on the remediation objectives, the Preliminary Remediation Goals (PRGs) for the primary and secondary contaminants in ground water beneath the T-25 Area and off site are:

PRGs Based on Federal, State, or Regional Drinking Water Standards	
Chemicals	PRG, µg/L
Primary Chemicals of Concern	
Perchloroethylene (PCE)	5
Trichloroethylene (TCE)	5
Secondary Chemicals of Concern	
Chromium	100
Lead	15
Manganese	1,700
Nickel	100
Thallium	2
Vanadium	50
DDT	0.3
Bis(2-ethyl hexyl)phthalate	6

The choice of federal, state or regional drinking water standards was based on what was available and which were the most stringent.

SUMMARY OF CLEANUP ALTERNATIVES FOR T-25 AREA GROUND WATER

The Army looked at numerous technical approaches to determine the best way to reduce the risks associated with the contaminated ground water. The Army has developed and evaluated five alternatives to clean up T-25 Area and off-site ground water associated with the T-25 Area at SSC. With the exception of the "No Action" alternative, each alternative was developed to meet the remediation objectives. All alternatives require five-year reviews to confirm that they remain protective of human health and the environment.

Alternative 1: No Action - No response to contamination would be made, activities previously initiated would be abandoned, and no further active human intervention would occur. Natural attenuation of

the contamination is allowed to occur over time through dispersion, dilution, sorption, volatilization, and natural biological and chemical degradation. Consideration of a No Action alternative is required by the National Contingency Plan to serve as a baseline comparison for the other remedial alternatives.

Alternative 2: Limited Action/Institutional Controls and Monitored Natural Attenuation (MNA)

Natural attenuation of the contamination is allowed to occur over time and would be actively monitored to assess whether it is occurring and to what extent both on site and off site. The goal of MNA is to reduce contaminant concentrations to below federal and state drinking water standards, which are the key *Applicable or Relevant and Appropriate Requirements* (ARARs) for the cleanup of the T-25 Area ground water. MNA would follow EPA guidance. Institutional controls would be implemented to restrict access to on-site and off-site ground water during remedial action; specifically a local ordinance and an amendment to the SSC Master Plan would prohibit the future installation and/or current use of existing private drinking water wells in the area. Long-term ground water monitoring would be conducted to determine the efficacy of the alternative to clean up the ground water to meet federal and state drinking water standards.

Alternative 3: Ground Water Extraction with Air Stripping/Carbon Adsorption and Long-Term Monitoring, Institutional Controls, and MNA

Contaminated T-25 Area ground water would be pumped out of the ground using extraction wells and into air-stripping equipment that treats the contaminated ground water by removing the PCE and TCE. Air and water emissions are further treated using granular activated carbon. The treated ground water would be discharged to Lake Cochituate. The EPA considers this alternative a *presumptive remedy*. MNA would address any areas (e.g., off site) that are not contained by the ground water extraction system, and, if necessary, as a follow-up treatment for any residual contamination within the T-25 Area that is not actively remediated by the pump-and-treat system. The goal of MNA is to reduce contaminant concentrations to below federal and state drinking water standards, which are the key ARARs for the cleanup of the T-25 Area ground water. MNA would follow EPA guidance. On-site and off-site institutional controls would restrict access to ground water during remedial action;



specifically a local ordinance and an amendment to the SSC Master Plan would prohibit the future installation and/or current use of existing private drinking water wells in the area. Long-term ground water monitoring would be conducted to determine the efficacy of the alternative to clean up the ground water to meet federal and state drinking water standards.

Alternative 4: Ground Water Extraction with Liquid-Phase Activated Carbon and Long-Term Monitoring, Institutional Controls, and MNA - Contaminated T-25 Area ground water would be pumped out of the ground using extraction wells and through tanks containing activated carbon that remove PCE and TCE from the water. The EPA considers this remedy a presumptive remedy. Discharge to the lake, monitoring, institutional controls, and MNA are the same as Alternative 3.

Alternative 5: Ground Water Extraction with UV/Oxidation and Long-Term Monitoring, Institutional Controls, and MNA - Contaminated T-25 Area ground water would be pumped out of the ground using extraction wells and into equipment that destroys contamination by the addition of oxidizing chemicals and ultraviolet light. The EPA considers this remedy a presumptive remedy. Discharge to the lake, monitoring, institutional controls, and MNA are the same as Alternative 3.

How Does the Army Choose a Final T-25 Area Ground Water Cleanup Plan?

The Army uses nine required criteria, developed by EPA for CERCLA feasibility studies, to select a ground water cleanup plan or remedy that meets the goals of protecting human health and the environment, maintaining protection over time, and minimizing untreated waste. The following list highlights the questions that the Army must consider in selecting a cleanup plan. More detailed definitions are contained in Section 5.0 of the above-mentioned Focused Feasibility Study/Treatability Study.

- 1. Overall protection of human health and the environment:** Will the alternative protect human health and the plant and animal life on and near the site?
- 2. Compliance with *Applicable or Relevant and Appropriate Requirements (ARARs)*:** Does the alternative meet all pertinent federal and state environmental statutes, regulations, and requirements?
- 3. Long-term effectiveness and permanence:** Will the effects of the cleanup plan last or could contamination present a risk again over time?
- 4. Reduction of toxicity, mobility, or volume through treatment:** Does the alternative use treatment to reduce the harmful effects of the contaminants, the spread of the contaminants, and the amount of contaminated material?
- 5. Short-term effectiveness:** How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to site workers, residents, or the environment?
- 6. Implementability:** Is the alternative technically and administratively feasible? Are the right goods and services to implement the alternative readily available?
- 7. Cost:** What is the total cost of constructing and operating the alternative over time, in today's dollars? Does the plan give necessary protection in proportion to its cost.
- 8. Regulatory acceptance:** Do state environmental agencies agree with the proposed cleanup plan?
- 9. Community acceptance:** What suggestions or modifications does the public offer during the comment period?



August 1999

COMPARISON OF ALTERNATIVES

The following table summarizes the comparison of alternatives evaluated in the Focused Feasibility Study. The Feasibility Study performed a separate detailed analysis and comparison for each alternative using the nine EPA evaluation criteria (described on page 8). For simplification, the following table compares each alternative against the criteria in general terms.

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Limited Action	Alternative 3: Air Stripping*	Alternative 4: Activated Carbon	Alternative 5: UV/Oxidation
1. Overall Protection of Human Health and the Environment	○	◐	●	●	●
2. Compliance with ARARs	◐	◐	●	●	●
3. Long-Term Effectiveness and Permanence	○	◐	●	●	●
4. Reduction of Toxicity, Mobility, or Volume through Treatment	○	○	●	●	●
5. Short-Term Effectiveness	○	◐	●	●	●
6. Implementability	●	●	●	●	●
7. Capital (Construction) Cost	-	\$20,000	\$370,000	\$390,000	\$480,000
Operatoins and Maintenance Costs	\$77,800	\$2,560,000	\$4,040,000	\$4,270,000	\$4,660,000
Total Present Worth	\$77,800	\$2,580,000	\$4,410,000	\$4,660,000	\$5,140,000
8. Regulatory Acceptance	State acceptance will be evaluated after the public comment period.				
9. Community Acceptance	Community acceptance will be evaluated after the public comment period.				
Estimated Time to Reach Cleanup Goal (years)	50	50	27 ¹	27 ¹	27 ¹

Notes: ● - Meets or exceeds criteria

◐ - Partially meets criteria

○ - Does not meet criteria

* - Air Stripping was selected for a Treatability Study.

1 - Estimated (from a ground water model) cleanup time includes a 10-year pumping period and a 17-year monitored natural attenuation period. The 5-year post-cleanup monitoring period is not included in the estimated time to reach cleanup.

Cleanup times are estimated from a ground water model and only serve as a basis for calculating the costs associated with each of the alternatives. These times do not indicate when an alternative would be "shut off." A remedial alternative is discontinued when actual chemical monitoring data meet the goals of the cleanup.

Information in this table is taken from Section 5 of the *Focused Feasibility Study/Treatability Study, T-25 Area at the U.S. Army Soldier Systems Center (SSC), Natick, Massachusetts* (Fall 1999). This document is part of the *Administrative Record* and is available for public review.



THE ARMY'S PROPOSED T-25 AREA GROUND WATER CLEANUP PLAN

The Army's proposed cleanup plan for the T-25 Area ground water is Alternative 3: Ground Water Extraction with Air Stripping/Carbon Adsorption and Long-Term Monitoring, Institutional Controls, and Monitored Natural Attenuation. This alternative is one of EPA's preferred approaches to treating solvent-contaminated ground water. The combination of these actions would meet the remediation objectives (page 6). In summary, ground water pump-and-treat would contain T-25 Area contamination and bring back off-site contamination; its efficacy would be monitored on-site and off site. Institutional controls would prohibit anyone from using both the contaminated on site and off site ground water, natural attenuation processes would be actively monitored on site and off site, and all actions would be regularly reviewed to ensure continued protection of human health and the environment. The proposed T-25 Area ground water cleanup would continue until PCE and TCE in the ground water beneath the T-25 Area are below federal and state drinking water standards. The preferred alternative can change in response to public comment or new information.

How does it work?

This plan includes pumping contaminated ground water from beneath the T-25 Area into a treatment system. The extraction wells are located in the areas where the highest PCE and TCE concentrations have been found. Pumping from the extraction wells would remove the T-25 Area contamination from the ground, and prevent contamination from leaving the site. Pumping during the current Treatability Study has already reduced PCE and TCE concentrations from approximately 500 parts per billion (ppb) to less than 50 ppb in the on-site extraction wells, and has reduced off-site TCE to the west from approximately 25 ppb to 6 ppb and to the north from 50 ppb to 28 ppb (March 1999 data).

The contaminated ground water would be pumped to the treatment system housed in a new building in the T-25 Area. The treatment system has the following process units which are illustrated in Figure 3:

- Influent equalization tank
- Air stripper
- Vapor-phase activated carbon adsorption
- Particulate filter system for oxidized metals and suspended solids
- Liquid-phase activated carbon adsorption

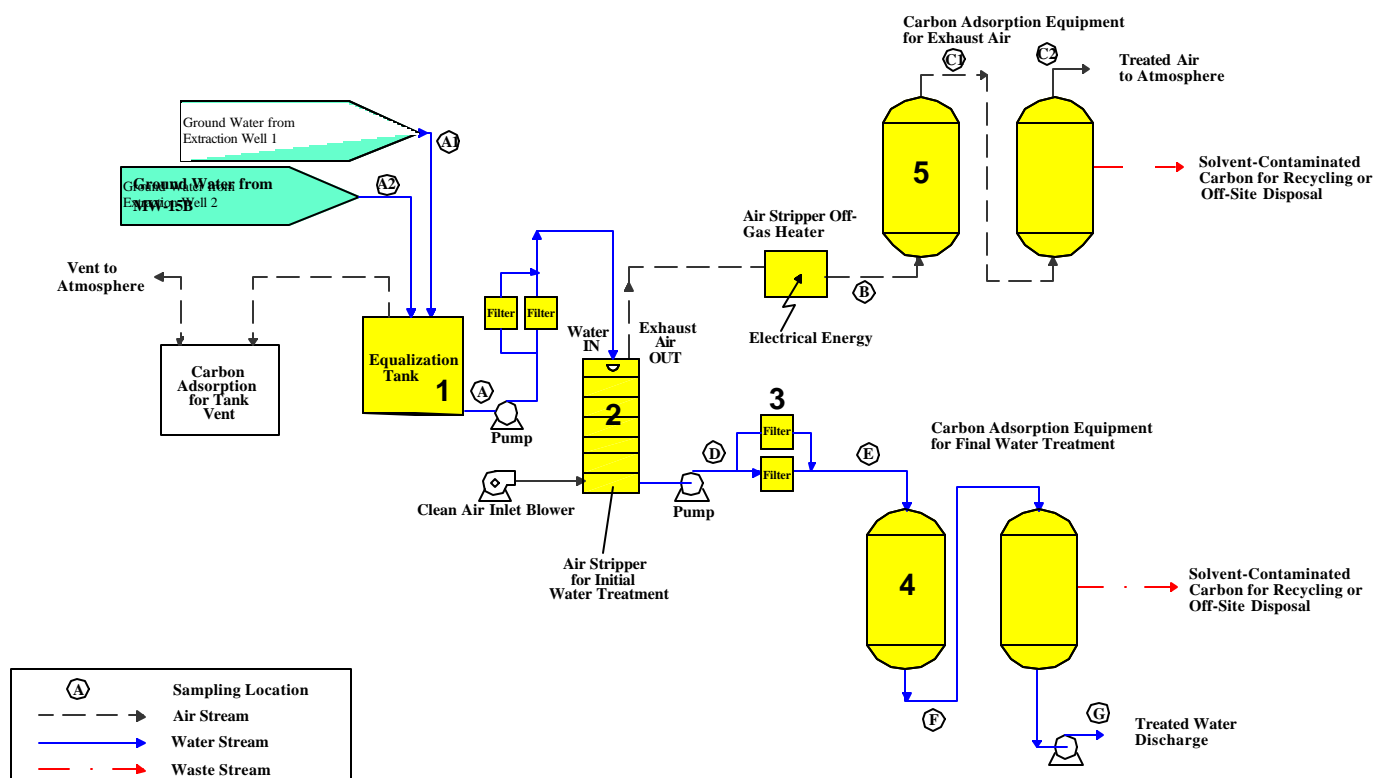
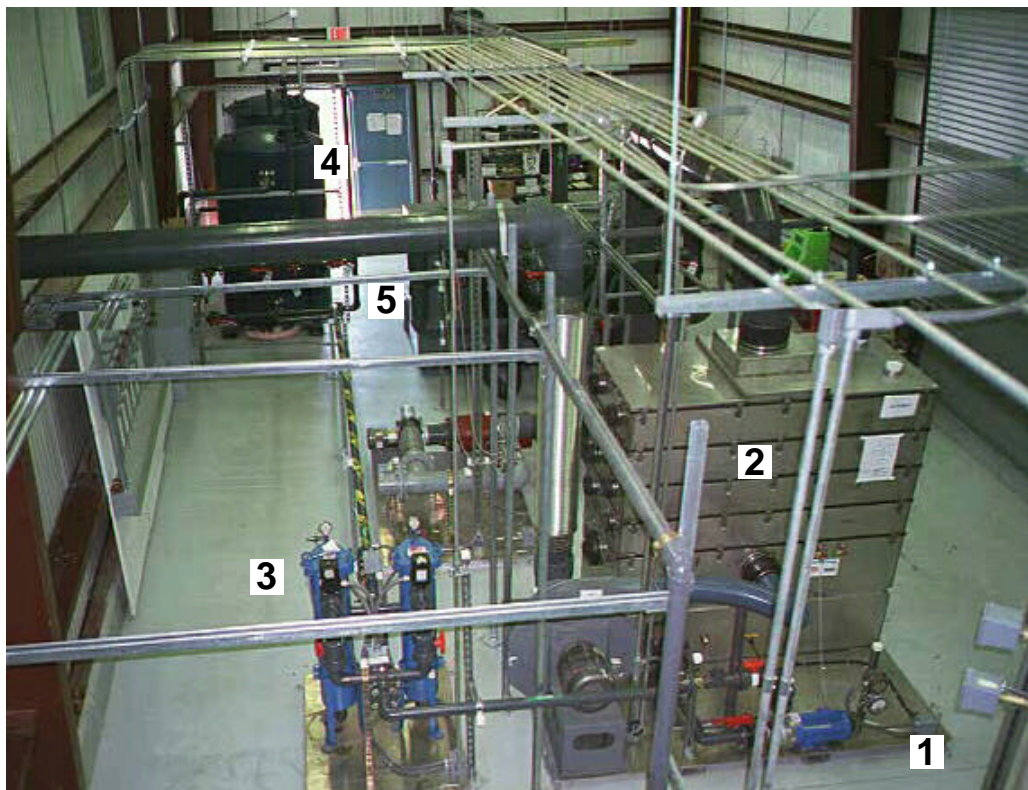
The contaminated ground water would be treated by an air stripper that forces the dissolved solvents out of the water into a controlled air stream. As an additional safeguard, the water would be further cleaned by granular activated carbon before being released to Lake Cochituate. The air from the air stripper would also be treated by granular activated carbon. Air and aqueous effluents would be regularly monitored to ensure clean emissions. The solvents trapped by the carbon would be recycled/disposed at a permitted off-site facility. The extraction system prevents the migration of the T-25 Area contaminants during remediation.

Long-Term Monitoring. Ground water conditions would be regularly monitored to make sure the primary contaminant (TCE and PCE) concentrations are decreasing both on site and off site and that contamination is not moving away from the T-25 Area. Secondary contaminants would also be monitored in ground water to ensure that these will meet the cleanup goals. These secondary contaminants include metals (chromium, lead, manganese, nickel, thallium, and vanadium), a pesticide (DDT), and a plasticizer [bis(2-ethylhexyl) phthalate]. The results of monitoring on-site and off-site wells would be used to determine if cleanup goals have been met and if the treatment system can be shut down. Protective point-of-compliance (POC) wells would be selected in areas downgradient of the contaminant plume and monitored to ensure that contaminant concentrations do not exceed the cleanup goals during and after the remedial action. The Army would notify appropriate federal, state, and town officials if a release or a ground water exceedance has occurred in these protective POC wells.

A long-term monitoring plan would be developed after the *Record of Decision* has been signed, and would describe in detail the procedures for notification and evaluation if an exceedance in protective POC wells has occurred.

In addition, air and water discharged from the treatment system would be monitored to ensure that contaminant levels meet federal and state regulations. Contaminant concentrations in effluent waters would be regularly monitored to ensure that discharges of treated ground water comply with the Federal Clean Water Act and the Massachusetts Surface Water Discharge Permit Program.

Figure 3: Photograph and Schematic Diagram of T-25 Area Ground Water Treatment System





Institutional Controls. Institutional controls would be implemented to restrict access to the ground water both on site and off site throughout the remedial action. On-site use would be restricted through the Army's Master Plan for SSC, and these use/access restrictions would be implemented through appropriate real estate transfer documents if the site property were ever transferred from Army ownership. Off site, the access restriction would be a local legal restriction in the study area where contaminated ground water has been found. A Natick Board of Health ordinance would prohibit the future installation and/or current use of existing private drinking water wells in the area. The town of Natick would have primary responsibility for monitoring and enforcing the ordinance, while the Army would be ultimately responsible to ensure that the institutional control remains in place and is effective and protective of human health and the environment.

Monitored Natural Attenuation. This proposed plan for ground water cleanup also includes MNA as part of the treatment alternative. MNA is expected to reduce contaminant concentrations in ground water over time through natural in-situ processes that include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization. MNA would address any off-site areas that are not contained by the ground water extraction system, and if necessary, as a follow-up treatment for any contamination within the T-25 Area that is not actively remediated by the air stripping pump-and-treat system. Natural attenuation of primary and secondary contaminants, on site and off site, would be actively monitored. An MNA Evaluation Plan, based on EPA guidance, would be developed after the Record of Decision is accepted.

Additional Protection of Public Health and Safety. To further protect the drinking water of the town of Natick, the Army has made a commitment to participate in the operation of the air stripping system at the town's Springvale Treatment Plant. This system, which is already built and operating, ensures that Natick's drinking water will continue to meet all federal and state safe drinking water standards.

Five-Year Reviews. Reviews of this remedy would occur at least every five years to ensure adequate protection of human health and the environment. The review may determine that cleanup goals have been met, or that the extraction and treatment system, or other components of the remedy, may be modified to meet remedial action objectives. Also at each review, new remedial technologies may be evaluated to determine applicability.

Why was this plan selected?

This alternative was selected as the proposed cleanup plan for the T-25 Area ground water because it would actively contain and remediate the ground water contamination, it would be protective of human health and the environment, and it would comply with all environmental laws and regulations. This alternative can be implemented easily since the Treatability Study is currently using this technology, based on the EPA's presumptive remedy guidance for streamlining remediation of CERCLA sites. Results of the Treatability Study confirm that the preferred alternative would successfully protect human health and the environment by preventing migration of ground water with contaminants above federal and state drinking water standards from the T-25 Area.

Based on information currently available, the Army believes that the preferred alternative provides the best balance of tradeoffs among the other alternatives with respect to the nine CERCLA criteria. This preferred alternative was selected over the other alternatives because the Army expects it to satisfy the statutory requirement in CERCLA Section 121(b) to 1) be protective of human health and the environment, 2) comply with ARARs, 3) be cost-effective, 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and 5) satisfy the preference for treatment as a principal element. The key ARARs that the selected alternative will meet include Safe Drinking Water Act Maximum Contaminant Levels (SDWA MCLs), Massachusetts Contingency Plan Method S-1/GW-1 Standards (MCP S-1/GW-1), and Clean Water Act National Pollutant Discharge Elimination System (CWA NPDES) Standards. The SDWA MCLs and MCP S-1/GW-1 standards must be met for the ground water, while the CWA NPDES standards must be met for the effluent.



PUBLIC COMMENTS ON THE PROPOSED PLAN

During the 30-day formal comment period, the Army will accept written comments on the Proposed Plan and will hold a Public Hearing to accept either verbal or written comments. The Army, along with the EPA and DEP, uses public comments to improve the T-25 Area ground water cleanup proposal. Public comments are an important part of the cleanup process for the T-25 Area ground water. Based upon new information or public comments, the preferred alternative presented in this Proposed Plan can be modified or a different alternative can be selected. Therefore, the Army is encouraging the public to comment on this Proposed Plan.

Where to Submit Formal Comments

The Army is accepting formal comments on the Proposed Plan through September 24, 1999. You can submit a formal comment in any of the following ways:

1. Offer verbal or written comments during the Public Hearing: on September 16, 1999 at 7:00 P.M. at the Town of Natick Main Fire Station, 22 East Central Street.
2. Send written comments, postmarked by September 24, 1999, to:
Mr. John McHugh
Environmental, Safety & Health Office
U.S. Army Soldier Systems Center
Kansas Street
Natick, Massachusetts 01760-5049
3. Submit comments by fax to: Mr. John McHugh @ (508) 233-5393.
4. Send an electronic mail message to: jmchugh@natick-emh2.army.mil

Please use the last page of this document to submit written comments.

Why Submit Formal Comments?

Your comment will become part of the official public record, a crucial element in the decision-making process. The Army, along with federal and state regulators, will consider all formal comments before making the final selection of a remedial action or cleanup plan for the T-25 Area ground water.

A transcript of all formal comments on the Proposed Plan and the Army's written responses to each formal comment will be published in a document called a Responsiveness Summary that will accompany the Record of Decision that describes the final, approved

cleanup plan for the site. The Responsiveness Summary becomes part of the Administrative Record available for public review at the Natick Public library.

It is important to note that only comments received during the formal comment period (received at the public hearing or postmarked by September 24, 1999) will be documented in the Responsiveness Summary. However, the Army will respond to all comments as part of our ongoing community involvement program. For example, public comments and questions make up a large part of the *Environmental Report* - a newsletter published by SSC. Copies of this newsletter are available at the Natick Public Library, along with more detailed reports on the environmental investigations completed at the site.



Glossary

Air Stripping: The process of removing volatile chemical(s) from water by forcing air through the water. Chemicals are transferred from the water to the air.

Administrative Record: An official compilation of site-related documents, data, reports, and other related information that is considered important in the decision-making process relative to a Superfund site. The public has access to this material at the Natick Public Library, the SSC, the EPA, and the DEP.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal and/or more stringent state environmental laws and regulations that must be met during the implementation and completion of remedial actions.

Carbon Adsorption: Removal of chemicals in water and/or air by adsorbing them onto the surface of granular carbon material.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): The Federal law, commonly known as Superfund, that created a trust fund to investigate and clean up abandoned or uncontrolled hazardous substance facilities.

Feasibility Study: A study performed to identify and evaluate options for remedial action to reduce risk to human health and the environment.

Ground Water: Water found beneath the ground surface.

Installation Restoration Program A Department of Defense program that was implemented at military bases to identify, investigate, and clean up contamination resulting from past operations.

Institutional Controls: Access controls such as deed restrictions, zoning, or land-use restrictions that prevent specified activities from occurring in specific areas to reduce or eliminate exposure.

National Priorities List (NPL): The EPA's list of the nation's top priority hazardous substance facilities that may be eligible to receive Federal funds for investigation and cleanup under the Superfund program.

Natural Attenuation: The natural reduction of the mass, toxicity, mobility, volume, or concentration of contaminants in soil and ground water by processes such as biological degradation, dispersion, dilution, sorption, volatilization, and chemical and biological stabilization.

Operable Unit: A discrete portion of a site or a discrete action representing an incremental step in the investigation and remediation of hazardous substances at a facility.

Perchloroethylene (PCE): A chemical typically used as a dry cleaning solvent. Exposure may cause a variety of health problems in animals, including damage to the liver and central nervous systems. Its ability to cause cancer in humans is currently under review by the EPA.

Presumptive Remedy: Preferred technologies for common categories of contaminated sites, chosen by the EPA based on historical patterns of remedy selection and engineering evaluation of technology implementation data.

Proposed Remedial Action Plan (Proposed Plan): A document that summarizes for the public the preferred remedial action or cleanup plan for a site and presents the rationale for the preference.

Record of Decision: A legal document that describes the remedy or cleanup plan selected for an NPL site.

Remedial Action: Actual implementation of the selected remedy to reduce or eliminate the long-term risks to human health or the environment from exposure to contaminants.

Remedial Investigation: An investigation conducted to gather and analyze data necessary to determine the nature and distribution of contamination at a site and to provide information for performing a Feasibility Study.

Risk Assessment: An evaluation of human health and ecological risk resulting from exposure to a contaminant.

Trichloroethylene (TCE): A chemical used for degreasing and also for dry cleaning. It has been shown to cause liver, kidney, and neural damage in animals. It was previously classified by the EPA as a probable human carcinogen. However, this assessment is being reviewed.



Use This Page to Write Your Comments

To: Mr. John McHugh
Environmental, Safety & Health Office
U.S. Army Soldier Systems Center
Natick, Massachusetts 01760

[illegible]

[illegible]

How to Contact Us

Soldier Systems Center

Jerry Whitaker (508) 233-5340 [jwhitaker@natick-emh2.army.mil]
John McHugh (508) 233-5550 [jmcugh@natick-emh2.army.mil]
fax: (508) 233-5393

Massachusetts Department of Environmental Protection

Robert Campbell (617) 292-5732 [Robert.Campbell-EQE@state.ma.us]
fax: (617) 292-5530

U.S. Environmental Protection Agency

Jerry Keefe (617) 918-1393 [keefe.jerry@epa.gov]

Restoration Advisory Board Community Co-Chair

Marco Kaltofen (508) 653-6588 [kaltofen@aol.com]

Agency for Toxic Substances and Disease Registry

Susanne Simon (617) 918-1492

U.S. Army Soldier Systems Center Proposed Plan to Clean Up Ground Water at the T-25 Area

Environmental, Safety, and Health Office
Building 4, Room D-105
U.S. Army Soldier Systems Center
Kansas Street
Natick, MA 01760-5049

Bulk Rate
U.S. Postage
PAID
Natick, MA
No. 115